Table Comparing the Theory of Entropicity (ToE) vs Entropic Dynamics vs Information Geometry vs Quantum Relative Entropy

1. Comparison table: ToE vs Entropic Dynamics vs Information Geometry

Axis	Theory of Entropicity (ToE)	Entropic Dynamics (ED)	Information Geometry (IG)
Ontological status of entropy	**Fundamental physical field** with its own action, equations of motion, and local–spectral structure	Epistemic quantity governing **inference** about microstates	Statistical descriptor of **uncertainty** on parameter spaces
Status of information geometry	**Identified with physical spacetime geometry**; metric of distinguishability = metric of spacetime	Abstract configuration space for probability distributions; not identified with physical spacetime	Abstract statistical manifold; geometry of model families, not physical spacetime
Core dynamical principle	**Obidi Action** (local + spectral) for an entropic field; field equations for geometry, matter, and gauge sectors	Maximum entropy + entropic updating; trajectories as entropic inferences	Geodesics, curvature, and connections on statistical manifolds; no fundamental action principle for physics
Role of geodesics	Geodesics of the entropic metric are **physical trajectories in spacetime**	Geodesics represent **most probable inference paths** in configuration space	Geodesics encode **optimal statistical transitions** between distributions
Origin of spacetime geometry	**Generated by the entropic field**; curvature is entropic in origin	Background structure; not derived from entropy	Given as Fisher–Rao/Fubini–Study metric; not derived from a physical field
Treatment of matter and gauge fields	**Emergent from the entropic field** via amplitude/phase	Not derived; ED typically assumes a	Not addressed; IG is agnostic about matter/gauge content

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Axis	Theory of Entropicity (ToE)	Entropic Dynamics (ED)	Information Geometry (IG)
	decomposition and spectral sector	given Hamiltonian or constraints	
Cutoff / scale structure	Explicit **entropic cutoff Λ** and local–spectral duality; spectral action for global structure	No intrinsic cutoff; scale enters via chosen constraints	No fundamental cutoff; scales come from model choice
Category of theory	**Physical field theory** with unifying ambitions (geometry, matter, gravitation)	**Inference framework** for dynamics; reinterpretation of mechanics	**Mathematical framework** for statistics and learning
Status of forces / gravity	Gravity and interactions arise from **entropic geometry** and its field equations	Forces emerge as **entropic drifts** in probability space	Forces not primary; IG may model them statistically but not derive them
Goal	Entropic origin of **spacetime, fields, and dynamics**	Entropic reinterpretation of **quantum and classical dynamics**	Geometric understanding of **statistical models and inference**

Axis-Based Comparison: Theory of Entropicity (ToE) vs Ginestra Bianconi's Gravity from entropy (GfE)

Axis	Theory of Entropicity (ToE)	Gravity-from-Entropy (GfE)
Ontological status of entropy	Entropy is a **fundamental physical field** with its own action, equations of motion, and local–spectral structure.	Entropy is a **quantum relative entropy functional** comparing geometries; not a physical field but an information-theoretic measure.

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Axis	Theory of Entropicity (ToE)	Gravity-from-Entropy (GfE)
Origin of geometry	Spacetime geometry is **generated by the entropic field**; curvature is entropic in origin.	Geometry is compared via **relative entropy between quantum states of geometry**; gravity emerges from entropy differences, not from a field.
Core dynamical principle	Obidi Action (local + spectral) yields field equations for geometry, matter, and gauge sectors.	Variation of **quantum relative entropy** defines emergent gravitational dynamics.
Role of geodesics	Geodesics of the entropic metric are **physical trajectories** in spacetime.	Geodesics arise from **entropy-optimized geometry transitions**, not from a physical entropic metric.
Treatment of matter and fields	Matter and gauge fields **emerge from the entropic field** via amplitude/phase decomposition and spectral structure.	GfE does **not derive matter or gauge fields**; focuses solely on emergent gravity from entropy.
Cutoff / scale structure	Explicit entropic cutoff Λ and local–spectral duality; spectral action governs global structure.	No intrinsic cutoff; scale enters through the **quantum states of geometry** used in the relative entropy functional.
Category of theory	A **unifying physical field theory** for geometry, matter, and gravitation.	An **information-theoretic gravitational framework** based on relative entropy.
Status of gravity	Gravity arises from **entropic geometry** and its field equations.	Gravity emerges from **quantum relative entropy between geometries**.
Goal	Entropic origin of spacetime, fields, and dynamics.	Derive gravity from **information-theoretic entropy** without invoking a fundamental field.

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Comparative Research Landscape of Entropic Dynamics, Information Geometry, Quantum Relative Entropy, and the Theory of Entropicity (ToE)

The following table presents a clear comparison of the major intellectual frameworks that explore entropy, inference, and information as foundational elements of physical theory. It highlights the key researchers whose work defines each field, allowing readers to understand the lineage, scope, and conceptual orientation of Entropic Dynamics, Information Geometry, and the Theory of Entropicity (ToE).

The landscape of entropy-based theoretical frameworks spans several distinct intellectual lineages, each with its own foundational assumptions, mathematical structures, and leading investigators. Within this landscape, **Ginestra Bianconi** occupies a dual position: she is a leading figure in *Network Entropy, Entropic Network Geometry, and Entropy-Driven Network Evolution*, and she is also the originator of the recent **Gravity-from-Entropy (GfE)** framework. Crucially, GfE is *not* derived from network entropy; instead, it is formulated using **quantum relative entropy between geometries** to define an emergent gravitational dynamics. This places GfE in a conceptual category distinct from her network-theoretic work, and also distinct from Entropic Dynamics (ED), Information Geometry (IG), and Information-Theoretic Physics.

All names and details are presented exactly as they appear in the established scholarly literature, without modification, omission, or interpretive alteration.

Framework	Key Researchers	Notes
Theory of Entropicity (ToE)	John Onimisi Obidi	Entropy as ontological primitive; κ–ρ_s fields; Obidi Action
Entropic Dynamics (ED)	Ariel Caticha, Kevin Vanslette, Daniel Bartolomeo, John Skilling	Quantum mechanics from inference; entropic time
Information Geometry (IG)	Shun-ichi Amari, Hiroshi Nagaoka, C.R. Rao, Nihat Ay,	Fisher metric; α-connections; statistical manifolds

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Framework	Key Researchers	Notes
	Frank Nielsen, Sumio Watanabe	
Information Dynamics / Info-Theoretic Physics	Rolf Landauer, Wojciech Zurek, Christopher Fuchs, Seth Lloyd, J.A. Wheeler, Luciano Floridi	Information-based physics; decoherence; “It from Bit”
Gravity-from-Entropy (GfE)	Ginestra Bianconi	Emergent gravity derived from quantum relative entropy between geometries; distinct from network-based entropy frameworks